Stormwater Priority Projects Master List

Revisions to Severity Score System

Lexington, Kentucky

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Prepared for:
Lexington-Fayette Urban County Government
Division of Water Quality

Engineers · Architects · Planners

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EXECUTIVE SUMMARY

The Consent Decree requires that the LFUCG develop a methodology to evaluate flood prone areas and prioritize future capital projects that are intended to reduce flooding impacts to property in residential and commercial areas.

This report summarizes GRW recommendations for ranking projects on the Stormwater Priority Projects Master List, and how projects are completed or removed from the list.

We recommend the following:

1. Create three lists: the Opportunity list, the Resolved List, and the Unresolved List.

2. Clarify the steps following notification of a flooding issue.

3. Complete a preliminary engineering report for every verified issue.

4. Compute a severity score after completion of the preliminary engineering report.

5. Organize the projects on the Opportunity List by color: Green--projects with high scores, Yellow - projects with moderate scores and Red - projects that have low scores or nearly insurmountable constraints.

6. Allow the public to see the Opportunity List and the status of projects through an internet accessible GIS system

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BACKGROUND

The LFUCG has maintained the Stormwater Priority Projects Master List for many years. Currently, the list contains approximately 50 potential projects. The project priority list currently includes pending projects, completed projects, partially completed projects and projects recommended for removal from the list. Historically, projects were added to the list following a citizen complaint and a brief field investigation by LFUCG staff. At that time, a severity score was assigned based on limited information. A two-year wait was assigned to new projects. Project costs were updated annually.

RECOMMENDATION

We recommend revising the process of listing projects to make it easier to use and understand.

Our specific recommendations are:

1. Create three lists: the Opportunity List, the Resolved List, and the Unresolved List.

    a. Projects on the Opportunity List will have been fully evaluated and scored to the extent of a reliable opinion of probable cost and schedule. This constitutes a completed Preliminary Engineering Report. They will be classified as Green - shovel ready, Yellow – affordable, with some obstacles, Red – affordability/constructability issues.

    b. Projects on the Resolved List were either resolved by maintenance or are a completed capital improvements.

    c. Projects on the Unresolved List are those determined not eligible or the preferred solution was not acceptable to any of the impacted property owners.

2. Clarify the status of projects on the lists. This requires establishing definitions and a process for how projects get on and off the list.

3. Add new projects as a result of phone calls, public meetings, watershed master plan development, and modeling studies.

The goal for all projects on the Opportunity List is to have enough information about each project to determine the budget and obstacles to construction.

STATUS CATEGORIES

The suggested status categories of the projects on the OPPORTUNITY list are:

1. GREEN: an opportunity score greater than 60 and no known construction constraints
2. YELLOW: an opportunity score greater than 40 and minor construction constraints that just require time to resolve
3. RED: an opportunity score less than or equal to 40 and/or major construction constraints

Sub status is also suggested:

A. AWAITING FUNDING: Project has been scored and put on priority list, but has not acquired funding or gone to final design.

B. FINAL DESIGN: The project is in final design, easement acquisition, or awaiting a construction bid.

C. CONSTRUCTION PHASE: Project has been bid, a contractor has been selected, and construction is ongoing.

Other items to note on the Opportunity list are the anticipated schedule, and the project's proximity to a planned sanitary sewer, utility, roadway, or other development project.

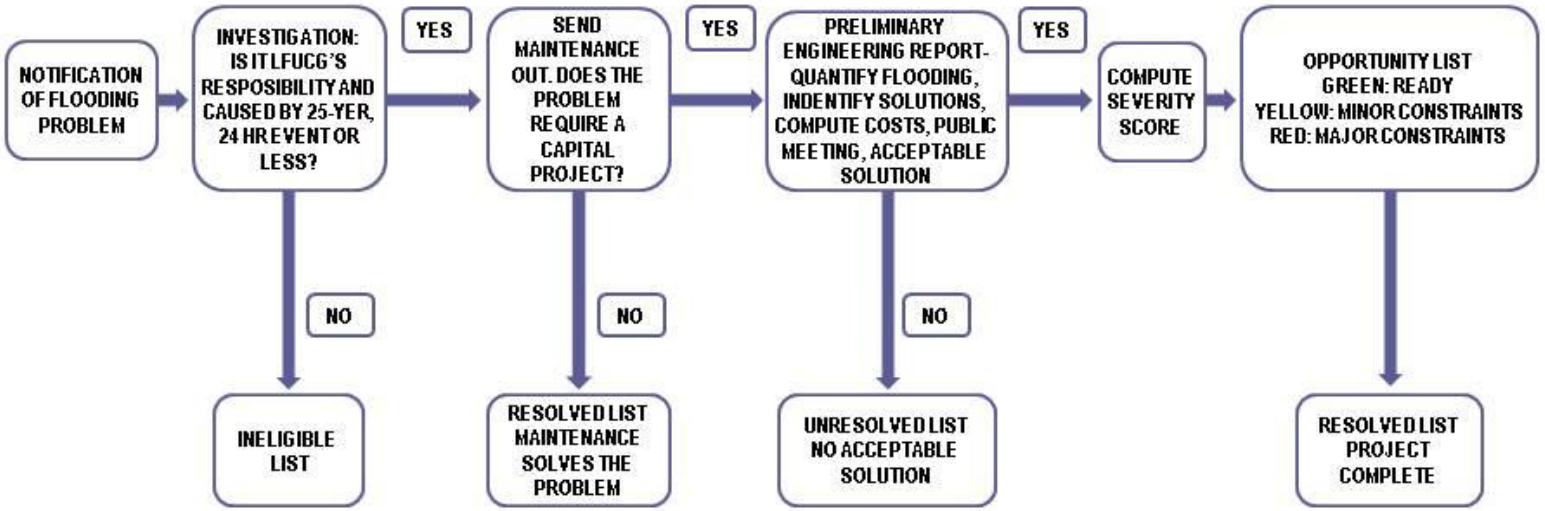
The suggested status categories of the projects on the RESOLVED list are:

1. SOLVED BY MAINTENANCE
2. COMPLETE: The flood issue has been mitigated by a capital project (generally improvements to the storm infrastructure, purchase and demolition of the flooded homes, or a combination).
3. RECOMMENDED FOR REMOVAL: Project recommended for removal from the list because the property owner is no longer concerned about flooding, or adverse conditions were resolved in some other manner.

The suggested status categories of project on the UNRESOLVED LIST are:

1. INELIGBLE: Flooding was not caused by a 25-year or less storm event or it is the responsibility of another entity such as the owner or KYTC.
2. SOLUTION NOT ACCEPTABLE: The recommended solution was not acceptable to any of the impacted property owners. The project may be revisited if owners change.

Severity Score Process



SEVERITY SCORE

In the current system a severity score is computed for each project. The severity score is based on 22 items and relies on both an evaluation of the flooding problem and the probable solution. An "efficiency value" expressed as cost per severity point is used to rank the projects.

We recommend a simplified rating system for projects after the preliminary engineering report is complete. Ratings can be adjusted or refined based of changes in circumstances, such as road, sanitary sewer reconstruction, or other utility work in the neighborhood.

A maximum score of 100 points is recommended. Table 1 lists the maximum score criteria. Example severity scores are included in Appendix B.

Table 1
Severity Score Criteria

	Evaluation Category	Scoring Criteria	Maximum
1	Number of ERUs	3 points per ERU	30
2	Property Damage	1 point/$5,000 damage in the last 10 years	25
3	Frequency of Problem	Every two years or more: 25 pts Every two to five years: 20 pts Once every five to ten years: 10 pts Every ten to twenty five years: 5 pts Less often than every 25 years: 0 pts	25
4	Cost/ERU	Up to $50K/ERU: 20 pts $50 to 75K/ERU: 15 pts $75 to 100K/ERU: 10 pts $100 to 150K/ERU: 5 pts More than $150/ERU: 0 pts	20
		Total:	**100**

1. Number of ERUs

An ERU, or Equivalent Residential Unit, is the basis for the stormwater management fee with one ERU per residential parcel. Non-residential ERUs are based on the amount of impervious area, 2,500 square feet/ ERU. If flooding only affects a portion of a non-residential parcel, that portion of the parcel's ERUs should be used to compute the score. If street flooding occurs and access is blocked, then one point is added for each ERU with blocked access. If there are alternative routes to access the parcel, only assign points if all routes are blocked.

2. **Property Damage**

The property damage score is based on information from the property owner. Score 1 point for every $5,000 in damage over the most recent ten year period. The maximum score for this category is 25 points.

3. **Frequency of Problem**

The frequency of flooding is based on the owner/residence experience and can be verified with the hydrologic/hydraulic model. Include frequency of flooding that blocks access. The maximum score for this category is 25 points.

4. **Cost per ERU**

Cost should represent the opinion of probable cost from the preliminary engineering report. This cost divided by the number of ERUs is used to determine the score. A maximum of score for this category is 20 points.

Note: Several iterations were tested that give higher scores to projects that do not include purchase of flooded homes. The scoring shown in Table 1 treats all ERUs the same, whether the home is purchased or not.

REASONS FOR OMITTING ITEMS FROM THE SCORE

Several items were considered for the score and ultimately not included. These are:

- Health and Safety. All flooding carries some health and safety risk. It would be arbitrary to assign a score. Imminent danger projects will be addressed immediately and won't require a score.
- Water quality benefit. Most capital construction projects can add elements that benefit water quality, such as treatment units, riparian preservation, etc. Enhancement of water quality should be a goal of all projects.
- Regional Solution. A project that is a regional solution will score high in number of ERUs. A separate category is not needed. Like water quality, regional projects should be the goal.
- Proximity to another construction project. Rather than including this in the score, it could be a column on the Opportunity List.
- Schedule. This is another category that could be a part of the Opportunity List.

Additionally:

- Commercial properties are included fairly with the use of ERUs, rather than parcels.

DEFINITIONS

Commercial Area

An area developed for commercial or institutional uses including institutional facilities, retail, offices, apartment buildings, townhouse/condominium developments, golf courses or other non-single-family residential, non-agricultural, or non-industrial uses. (From LFUCG Code of Ordinances Chapter 16, Article 1.)

Commercial Facility Flooding

Flood waters enter the footprint of a commercial or institutional building during or following a 25 year storm event. This includes the primary buildings, and the building basements, and/or crawl spaces.

Equivalent Residential Unit (ERU)

For residential property, each parcel with structure flooding is one ERU. For non-residential property, the total number of ERUs for the parcel can be obtained from the LFUCG Division of Water Quality, or computes as 1 ERU for every 2,500 sq ft of impervious surface flooded.

Final Design

After the Preliminary Engineering Report is complete and before the construction contractor has begun work. During this phase, construction plans and specifications are prepared and permits and easements are obtained. Bid packages are prepared, advertised, and tabulated. This phase ends when the contractor is given notice to proceed.

Flood Waters

For the purpose of determining structure flooding; overland stormwater that enters under doors, through vents, through windows or other openings. Non-flood water includes groundwater that seeps in through walls, through cracks in floor, and drain backups.

Home Flooding

Flood waters enter the footprint of the residence during or following a 25-year storm 24-hour Type II SCS event. This includes basements, crawl spaces, and attached garages. It does not include detached structures. This is based on the hydraulic watershed or subshed model using the 24-hour, SCS type II distribution. If modeling indicated flooding depth within 0.5 feet, then a written confirmation of flooding from the property owner is required for property-specific mitigation.

Investigation

This phase of the project starts when the LFUCG Division of Water Quality becomes aware of a flooding concern. This may be a resident lodging a complaint with LexCall, a resident expressing a concern during a public meeting, or indications from watershed modeling that home or street flooding is occurring.

During this phase, three questions are answered:

1. Is there home, commercial building, or severe street flooding as a result of a 25-year, 24-hour storm event, or smaller?
2. Is this LFUCG responsibility?
3. Does this problem require a capital expenditure to fix? That is, it cannot be fixed with maintenance.

If the answer to all these question is yes, then the project is eligible for the Opportunity List. See attached Stormwater Concern Investigation Checklist in Appendix A.

LFUCG Facilities

LFUCG facilities are land, properties, and/or buildings which are owned and operated, or leased and operated, by the Lexington-Fayette Urban County Government. (From LFUCG Code of Ordinances Chapter 16, Article 1.)

LFUCG Responsibility

A problem related to inadequate LFUCG facilities or drainage infrastructure including sewers, inlets, basins and channels. Problems that are not LFUCG responsibility include those related to private infrastructure, Kentucky Transportation Cabinet (KYTC) right-of-way, and other state and federal facilities.

NOTE: We recommend that the public infrastructure policies be evaluated to clarify LFUCG responsibility. Current policies present a challenge to drainage improvements.

Preliminary Engineering Report

This phase consists of preparing a Preliminary Engineering Report that documents resident concerns, community outreach (to ensure all affected residents have been heard), hydrologic and hydraulic analysis to evaluate the severity and extent of flooding, proposed solutions, and an opinion of probable project cost. This report is sufficient to compute a severity score. The project cost should include construction items, property acquisition and professional services costs. Construction constraints such as other utilities, easements, and environmental concerns are identified in this phase and allow the project to be designated Green, Yellow, Red based on the construction constraints and score.

Residential Area

An area which has been developed for single family or two-family dwelling units. (From LFUCG Code of Ordinances Chapter 16, Article 1.)

Severe Street Flooding

One (1) foot of water on one or more traffic lanes and/or the crown of the road not visible.

APPENDIX A

STORMWATER ISSUE INVESTIGATION CHECKLIST

Stormwater Issue Investigation Checklist

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Once a call comes in (either from a resident, a council member, or other way) it is assigned to a LFUCG staff member and entered into Accela.

Resident Name: _____

Resident Number: _____

Address: _____

Nature of Complaint (phone call or visit):

Problem: _____

If basement, crawl space, or attached garage flooding, then check box: ☐ Home Flooding

How did the water get in (source of flooding)? _____

If under door, through window, vent, overland flooding, check box: ☐ Caused by Storm Event

If it is from a drain or through foundation wall, then it may be ground water problem.

Did your street flood?	Yes ☐	No ☐
Could cars pass?	Yes ☐	No ☐
Could an emergency vehicle get through?	Yes ☐	No ☐

(This is an early indication of severe street flooding but will be verified in preliminary engineering phase)

When has the flood problem occurred (date/no. of times): _____

Maintenance Inspection

Date: _____

Summary: _____

_____

_____

E**valuation**

Determine if this was equivalent to a 25yr-24hour (5.19 inch) storm using rainfall record for nearest gage

Rainfall Amount: _____ in Duration: _____ hr

Gage Location: _____

Home or severe street flooding for an event less than or equal to a 25yr 24hr storm.	Yes ☐	No ☐
Is this a project that is within LFUCG responsibility?	Yes ☐	No ☐

If no, identify and contact the responsible party. Describe: _____

A capital improvement project is likely to solve the problem.	Yes ☐	No ☐

If maintenance work might solve the problem, this should be tried before adding project to the priority list.

If it meets all the conditions, then the project can proceed to preliminary engineering.

Project Name (typically Street Name and block identifier): _____

Council District: _____

Watershed: NE SE WR TB CR WH EH

APPENDIX B

EXAMPLE SEVERITY SCORES AND BLANK TEMPLATE

Rogers Road

From the Preliminary Engineering Report

	Alternative 1
Describe Project	2x10 Box culvert
Number of ERUs mitigated	12
Property Damage	*Some damage reported, estimate $15,000*
Frequency	*Frequency about 4 times in 10 years*
Number of Easements	5
Number of MOUs obtained	0
Utility Relocation Required?	yes
Cost in thousands, K	$1,620K
Cost per ERU/mitigated	$135K

SEVERITY SCORE

			Max	Alt 1
1	ERUs mitigated	*3 points each*	30	30
2	Property Damage	*1 per $5k/last 10 yrs*	25	3
3	Frequency Score	*see below*	25	20
4	Cost/ERU mitigated	*see below*	20	5
			100	**55**

Frequency:		
	0-2 years	25 points
	2-5 years	20
	5-10 years	10
	10-25 years	5
	25+ years	0

Cost/ERU:		
	$0-50K	20 points
	$50-75K	15
	$75-100K	10
	$100-150K	5

OPPORTUNITY LIST

This project would be assigned **yellow** due to utilities and easements, no nearby planned construction projects, and the score.

Fort Sumter

From the Preliminary Engineering Report

	Alternative 1
Describe Project	Regrade and purchase
Number of ERUs mitigated	12
Property Damage	*Moderate Damage reported, estimate of $50,000*
Frequency	*5 times in 10 years*
Number of Easements	0
Number of MOUs obtained	0
Utility Relocation Required?	no
Cost in thousands, K	$1,870
Cost per ERU/mitigated	$155K

SEVERITY SCORE

			Max	Alt 1
1	ERUs mitigated	*3 points each*	30	30
2	Property Damage	*1 per $5k/last 10 yrs*	25	10
3	Frequency Score	*see below*	25	25
4	Cost/ERU mitigated	*see below*	20	0
			100	**65**

Frequency:		
	0-2 years	25 points
	2-5 years	20
	5-10 years	10
	10-25 years	5
	25+ years	0

Cost/ERU:		
	0-50K	20 points
	50-75K	15
	75-100K	10
	100-150K	5

OPPORTUNITY LIST

This project would be assigned **Green** due to the score and ease of construction.

Idle Hour North

From the Preliminary Engineering Report

	Alternative 1
Describe Project	Pipes & Inlets, reroute in street
Number of ERUs mitigated	6
Property Damage	*Some damage reported*
Frequency	*Frequency about 1 per year*
Number of Easements	0
Number of MOUs obtained	0
Utility Relocation Required?	no
Cost in thousands, K	$706K
Cost per ERU/mitigated	$118K

SEVERITY SCORE

			Max	Alt 1
1	ERUs mitigated	*3 points each*	30	18
2	Property Damage	*1 per $5k/last 10 yrs*	25	5
3	Frequency Score	*see below*	25	25
4	Cost/ERU mitigated	*see below*	20	5
			100	**53**

Frequency:		
	0-2 years	25 points
	2-5 years	20
	5-10 years	10
	10-25 years	5
	25+ years	0

Cost/ERU:		
	0-50K	20 points
	50-75K	15
	75-100K	10
	100-150K	5

OPPORTUNITY LIST

This project would be assigned **yellow** due to unknown utilities and the score.

From the Preliminary Engineering Report

	Alternative
Describe Project	
Number of ERUs mitigated	
Property Damage	
Frequency	
Number of Easements	
Number of MOUs obtained	
Utility Relocation Required?	
Cost in thousands, K	
Cost per ERU/mitigated	

SEVERITY SCORE

			Max	Alt 1
1	ERUs mitigated	*3 points each*	30	
2	Property Damage	*1 per $5k/last 10 yrs*	25	
3	Frequency Score	*see below*	25	
4	Cost/ERU mitigated	*see below*	20	
			100	

Frequency:		
	0-2 years	25 points
	2-5 years	20
	5-10 years	10
	10-25 years	5
	25+ years	0

Cost/ERU:		
	0-50K	20 points
	50-75K	15
	75-100K	10
	100-150K	5

OPPORTUNITY LIST

This project would be assigned due to